Sun Storage 16 Gb Fibre Channel ExpressModule Universal Host Bus Adapter, Emulex Installation Guide

For HBA Model 7101690

Part No: E24463-06
July 2015

Part No: E24463-06

Copyright © 2014, 2015, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Référence: E24463-06

Copyright © 2014, 2015, Oracle et/ou ses affiliés. Tous droits réservés.

Ce logiciel et la documentation qui l'accompagne sont protégés par les lois sur la propriété intellectuelle. Ils sont concédés sous licence et soumis à des restrictions d'utilisation et de divulgation. Sauf stipulation expresse de votre contrat de licence ou de la loi, vous ne pouvez pas copier, reproduire, traduire, diffuser, modifier, breveter, transmettre, distribuer, exposer, exécuter, publier ou afficher le logiciel, même partiellement, sous quelque forme et par quelque procédé que ce soit. Par ailleurs, il est interdit de procéder à toute ingénierie inverse du logiciel, de le désassembler ou de le décompiler, excepté à des fins d'interopérabilité avec des logiciels tiers ou tel que prescrit par la loi.

Les informations fournies dans ce document sont susceptibles de modification sans préavis. Par ailleurs, Oracle Corporation ne garantit pas qu'elles soient exemptes d'erreurs et vous invite, le cas échéant, à lui en faire part par écrit.

Si ce logiciel, ou la documentation qui l'accompagne, est concédé sous licence au Gouvernement des Etats-Unis, ou à toute entité qui délivre la licence de ce logiciel ou l'utilise pour le compte du Gouvernement des Etats-Unis, la notice suivante s'applique:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

Ce logiciel ou matériel a été développé pour un usage général dans le cadre d'applications de gestion des informations. Ce logiciel ou matériel n'est pas conçu ni n'est destiné à être utilisé dans des applications à risque, notamment dans des applications pouvant causer des dommages corporels. Si vous utilisez ce logiciel ou matériel dans le cadre d'applications dangereuses, il est de votre responsabilité de prendre toutes les mesures de secours, de sauvegarde, de redondance et autres mesures nécessaires à son utilisation dans des conditions optimales de sécurité. Oracle Corporation et ses affiliés déclinent toute responsabilité quant aux dommages causés par l'utilisation de ce logiciel ou matériel pour ce type d'applications.

Oracle et Java sont des marques déposées d'Oracle Corporation et/ou de ses affiliés. Tout autre nom mentionné peut correspondre à des marques appartenant à d'autres propriétaires qu'Oracle.

Intel et Intel Xeon sont des marques ou des marques déposées d'Intel Corporation. Toutes les marques SPARC sont utilisées sous licence et sont des marques ou des marques déposées de SPARC International, Inc. AMD, Opteron, le logo AMD et le logo AMD Opteron sont des marques ou des marques déposées d'Advanced Micro Devices. UNIX est une marque déposée d'The Open Group.

Ce logiciel ou matériel et la documentation qui l'accompagne peuvent fournir des informations ou des liens donnant accès à des contenus, des produits et des services émanant de tiers. Oracle Corporation et ses affiliés déclinent toute responsabilité ou garantie expresse quant aux contenus, produits ou services émanant de tiers, sauf mention contraire stipulée dans un contrat entre vous et Oracle. En aucun cas, Oracle Corporation et ses affiliés ne sauraient être tenus pour responsables des pertes subies, des coûts occasionnés ou des dommages causés par l'accès à des contenus, produits ou services tiers, ou à leur utilisation, sauf mention contraire stipulée dans un contrat entre vous et Oracle.

Accessibilité de la documentation

Pour plus d'informations sur l'engagement d'Oracle pour l'accessibilité à la documentation, visitez le site Web Oracle Accessibility Program, à l'adresse http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Accès au support électronique

Les clients Oracle qui ont souscrit un contrat de support ont accès au support électronique via My Oracle Support. Pour plus d'informations, visitez le site http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info ou le site http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs si vous êtes malentendant.

Contents

Using This Documentation 7

1 Universal HBA Overview 9
- Kit Contents 9
- Universal HBA Features and Specifications 9
- Operating System and Technology Requirements 11
- Boot Support 12
- System Interoperability 12
  - Host Platform Support 12
  - Storage Support 13
  - Switch Support 14
- Environmental Requirements 15

2 Universal HBA Installation, Configuration, and Removal 17
- Observing ESD and Handling Precautions 17
- Installing the Hardware 18
  - ▼ To Prepare for Universal HBA Installation 18
  - ▼ To Install the Universal HBA 21
- Changing the Operating Protocol Mode 22
- Connecting the Optical and Copper Cables 24
  - ▼ To Connect Optical Cables 25
  - ▼ To Connect Copper Ethernet Cables 25
- Powering on the System 26
  - ▼ To Apply Power to the System 26
  - Viewing LEDs 27
- Testing the Installation 30
  - ▼ To Verify Proper Installation (Oracle Solaris) 30
  - ▼ To Configure the Universal HBA (Oracle Solaris) 31
  - ▼ To Verify Attached Storage (Oracle Solaris) 31
- Configuring the Universal HBA for Hot-Plug Operation 31

▼ To Configure the Universal HBA for Hot-Plug Operation 31
Removing the Hardware 32
▼ To Prepare the Universal HBA for Removal Using the Attention (ATTN) Button 32
▼ To Prepare the Universal HBA for Hot-Plug Removal (Oracle Solaris) 33
▼ To Remove the Universal HBA Hardware 33

3 Software Installation 35
Driver Software for the Oracle Solaris OS 35
Oracle Solaris Diagnostic Support 35
Installing Software for the Red Hat and SUSE Linux OSes 36
▼ To Install the Universal HBA Software for the Linux OS 36
Installing Software for VMware Technology 37
▼ To Install the Universal HBA Software for VMware Technology 37
Installing Software for the Windows Server 2008 OS 37
▼ To Install the Software for the Windows Server 2008 OS 38
Configuration and Diagnostic Support 38
Upgrading Firmware 39
▼ To Upgrade Firmware Using the OneCommand Manager GUI 39
▼ To Upgrade Firmware Using the OneCommand Manager CLI 41

4 Known Issues 43
System Hangs When Performing a Hot Plug Operation 43
Link Aggregation Control Protocol (LACP) Cannot Be Used In Certain Conditions 45
SAN Boot Fails Via Direct Attached Storage on Oracle SPARC Systems 45

Glossary 47

Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain the universal host bus adapter
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

Product Documentation Library

Documentation and resources for this product and related products are available at http://docs.oracle.com/cd/E24648_01/index.html.

Feedback

Provide feedback about this documentation at http://www.oracle.com/goto/docfeedback.

♦ ♦ ♦ CHAPTER 1

Universal HBA Overview

This chapter provides a basic overview of the Sun Storage 16 Gb FC ExpressModule Universal HBA, which uses Emulex technology. This chapter also describes the various operating systems, host platforms, storage, and infrastructure configurations that support the universal HBA.

This chapter contains the following sections:

- "Kit Contents" on page 9
- "Universal HBA Features and Specifications" on page 9
- "Operating System and Technology Requirements" on page 11
- "Boot Support" on page 12
- "System Interoperability" on page 12
- "Environmental Requirements" on page 15

Kit Contents

- Standard option of the Sun Storage 16 Gb Fibre Channel (FC) ExpressModule Universal HBA, Emulex
- *Accessing Documentation* document
- China RoHS Material Disclosure document

Universal HBA Features and Specifications

The Sun Storage 16 Gb FC ExpressModule Universal HBA, Emulex (marketing part number 7101690) is a standalone PCI Express ExpressModule host bus adapter (HBA). This HBA is a reconfigurable board that changes its operating protocol mode from a two-port 16 Gb FC HBA to a two-port 10 GbE CNA, based on the optical transcievers and optical cables that you insert and attach to the board at boot time.

The board interfaces an eight-lane PCI Express bus, with eight lanes supporting two Fibre Channel (FC) or two Fibre Channel over Ethernet (FCoE) optical media ports. Each independent FC port operates at 16 Gb/sec and features 16/8/4 autonegotiation. Each FCoE port operates at 10 Gb/sec. You can configure the following three options:

- **10 GbE FCoE option** - The version of the card that provides twin-ax (or copper) 10 GbE FCoE ExpressModule Converged Network Adapter functionality. No optic modules are installed in this Converged Network Adapter.
- **16 Gb FC optics option** - The version of the card that has 16 Gb FC optics installed (optics marketing part number 7101686) in the SFP+ connecter of the card, providing short-wave 16 Gb Fibre Channel ExpressModule Host Bus Adapter functionality.
- **10 GbE FCoE optics option** - The version of the card that has 10 GbE optics installed (optics marketing part number 7101688) in the SFP+ connector of the card, providing short-range 10 GbE FCoE ExpressModule Converged Network Adapter functionality.

See Table 1-1 for a list of the universal HBA features.

TABLE 1-1 Universal HBA Features and Specification

Feature	Description
PCI connector	x8
PCI signaling environment	PCI Express x8 (8 active lanes)
PCI transfer rate (maximum)	PCI Express Generation Three (8 GT/s) x8
PCIe specification compliance	PCI Express Card Version 3.0 Specification
PCIe hot-plug and hot-swap functionality	Supported
Number of ports	Two
Number of devices supported	126 devices per FC loop (not supported at 16 Gb); 510 devices in Fabric mode
FCoE full offload in hardware	Meets requirement
FC bus type (external)	Fiber-optic media, short-wave laser, multi-mode fiber (400-M5-SN-S)
FC transfer rate	16 Gb/s
FC topologies	Switched fabric (N_Port), arbitrated loop (NL_Port) [FC-AL support for 4 G/8 G only]; and point-to-point (N_Port))
Receive Side Scaling	Supported
MSI-X	Supported
Solaris Dynamic Reconfiguration	Supported
Diagnostic Support	Provided by Oracle VTS software
Boot support	Ethernet, FCoE, and FC for all supported operating systems. For more information about boot support for the universal HBA, see Table 1-3.
RAM	1.5 MB, parity protected, per port
BIOS ROM	One 32-MB flash ROM, field-programmable
NVRAM	One 32-KB EEPROM
External connectors	■ Sun Storage 10 GbE FCoE optics, SR, Emulex (part 7101688) ■ Sun Storage 16 Gb FC optics, SR, Emulex (part 7101686)

Feature	Description
	■ SFP+ direct attach copper (DAC) twinaxial (twin-ax) cables from the supported switch manufacturers listed in "Switch Support" on page 14.
Small form-factor pluggable (SFP+)	Supporting options with short range, short-wave, and twin-ax cabling
Maximum FC cable length	At 16 Gb/s, up to 125 meters using 50/125 mm core OM4 fiber. Longer lengths are possible at slower data rates. For 10 GbE, up to 400 meters using 50/125 mm core OM4 fiber. For more optical cable specifications, see Table 2-1.
LED indicators	Two LEDs per channel (yellow and green) on the front panel as status indicators Power LED, Service RequiredLED, and a button on the front panel to support hot-swap functionality
Maximum power consumption	13.3 watts
Form Factor	PCI Express ExpressModule, single-wide (198 mm x 112 mm x 21 mm)

Operating System and Technology Requirements

The universal HBA requires the OS and technology levels listed in Table 1-2, at minimum.

TABLE 1-2 Supported Operating System/Technology Versions

Operating System/Technology	Supported Versions (minimum)
Oracle Solaris OS	■ Oracle Solaris 10 1/13 for the x86 (64-bit) platform (+ Patch ID 149623-02) ■ Oracle Solaris 10 1/13 for the SPARC platform (+ Patch ID 149622-02) ■ Oracle Solaris 11.1 for the x86 (64-bit) platform (+ SRU 6) ■ Oracle Solaris 11.1 for the SPARC platform (+ SRU 6)
Oracle Linux platform	■ Oracle Linux 5.9 (UEK 2.6.39-400.109.4, at minimum) ■ Oracle Linux 6.4 (UEK 2.6.39-400.109.4, at minimum) ■ Oracle VM 3.2.1
Linux OS	■ Red Hat Enterprise Linux (RHEL) 5.9 (64-bit) ■ RHEL 6.4 (64-bit) ■ SUSE Linux Enterprise Server (SLES) 10 U4 ■ SLES 11 U2
Microsoft Windows OS Enterprise and Standard Editions, WHQL Certified, MS Windows MPIO	■ Windows Server 2008 SP2+ (64-bit) ■ Windows Server 2008 R2 including SP1 (64-bit) ■ Windows Server 2012 (64-bit)
VMware technology	■ VMware ESXi 5.0, 5.1

Boot Support

FC SAN and FCoE SAN booting through the universal HBA is supported, as listed in Table 1-3.

TABLE 1-3 Universal HBA Boot Support

Operating System/Technology	FC SAN Boot Support	FCoE SAN Boot Support
Oracle Solaris 10 1/13	Yes	No
Oracle Solaris 11.1	Yes	No
Oracle Linux 5.9	No	No
Oracle Linux 6.4	Yes	No
Oracle VM 3.2.1	Yes	No
RHEL 5.9	Yes†	Yes†
RHEL 6.4	Yes†	Yes†
SLES 10 U4	Yes†	Yes†
SLES 11 U2	Yes†	Yes†
Windows Server 2008 SP2+	Yes†	Yes†
Windows Server 2008 R2	Yes†	Yes†
Windows Server 2012	Yes†	Yes†

†While using the Driver Update disk during the installation process. Driver Update is available at the Oracle support area of the Emulex web site: http://www.emulex.com/downloads/oem-qualified/oracle/

System Interoperability

This section provides information about selected platforms and storage that are compatible with the heterogeneous FC network design of the universal HBA. This section contains the following topics:

- "Host Platform Support" on page 12
- "Storage Support" on page 13
- "Switch Support" on page 14

Host Platform Support

The universal HBA is supported by the platforms listed in Table 1-4. For up-to-date information, see your system Product Notes and web pages.

For information about supported OS/technology versions, see Table 1-2.

TABLE 1-4 Platform Support

Platform	Supported OS/Technology
Oracle's SPARC Servers	
SPARC T4-4	Oracle Solaris
SPARC T5-1B	Oracle Solaris
Oracle Netra SPARC T5-1B	Oracle Solaris
Oracle's x86 Servers	
Netra X3-2 (Legacy BIOS mode only, no UEFI support)	Oracle Solaris, Windows, Linux, VMware
Sun Server X4-2B	Oracle Solaris, Windows, Linux, VMware

Storage Support

This section lists the supported arrays and tape storage that can connect to the universal HBA through a supported switch (see "Switch Support" on page 14). This section contains the following topics:

- "Array Support" on page 13
- "Storage System Support" on page 13
- "Tape Storage Support" on page 14
- "Unified Storage" on page 14

Array Support

The universal HBA supports connecting, through a supported switch, to the following arrays:

- Oracle's Sun Storage 2540 M2
- Oracle's Sun Storage 6140
- Oracle's Sun Storage 6180
- Oracle's Sun Storage 6190
- Oracle's Sun Storage 6540
- Oracle's Sun Storage 6590
- Oracle's StorageTek 6580/6780 with 8 Gb/s FC Host Interface cards

Storage System Support

The universal HBA supports connecting, through a supported switch, to the following storage systems:

- Oracle's Pillar Axiom 600 storage system
- Oracle's StorageTek 9980/9985/9985V storage system
- Oracle's StorageTek 9990/9990V storage system

Tape Storage Support

The universal HBA supports connecting, through a supported switch, to the following tape storage:

- Oracle's StorageTek SL24 Tape Autoloader
- Oracle's StorageTek SL48 Tape Library
- Oracle's StorageTek SL500 Modular Library
- Oracle's StorageTek L1400 Tape Library
- Oracle's StorageTek SL3000 Modular Library
- Oracle's StorageTek SL8500 Modular Library
- Oracle's StorageTek Virtual Tape Library: VTL Value and VTL Value Plus
- Oracle's StorageTek T10000B/ T10000C
- Oracle's StorageTek 9840C tape drive
- Oracle's StorageTek 9940B tape drive
- Oracle's StorageTek 9840D tape drive
- IBM LTO4
- IBM LTO5

Unified Storage

The universal HBA supports connecting, through a supported switch, to the following unified storage:

- Oracle's Sun Storage 7110, 7210, 7310, 7410 System (Target mode only)
- Oracle's Sun ZFS Storage 7120, 7320, 7420, 7720 System

Switch Support

The universal HBA supports the following Fibre Channel switches:

- Brocade 8000 (FCoE TOR Switch)
- Brocade 300 FC Switch

- Brocade 5100, 5300 FC Switch
- Brocade 6510 FC Switch (16 g)
- Brocade DCX, DCX-4S, DCX8510 FC Switch
- Cisco Nexus 5010
- Cisco Nexus 5020 (FCoE TOR Switch)
- Cisco 5548 FC/FCoE Switch
- Cisco 9148 FC switch (8 Gb FC)
- Cisco MDS 9513

Note - The universal HBA has been verified to function with Cisco 5*xxx* switches; however, Oracle Services does not support customers with questions or issues about these switches. Direct all inquiries about the use of Cisco 5*xxx* switches to Cisco Systems.

Environmental Requirements

The universal HBA environmental requirements are listed in Table 1-5.

TABLE 1-5 Universal HBA Environmental Requirements

Specification	Operating	Non-Operating
Temperature	0˚ to 55˚C, non-condensing	-20˚C to 85˚C, non-condensing
Relative Humidity (RH)	10% to 90% RH, non-condensing, 22˚C max wet bulb	5% to 95% RH, non-condensing, 22˚C max wet bulb
Altitude	3200 m	12,200 m
Vibration	0.25 g in all axes, 5-500 Hz sine	1.2 g in all axes, 5-500 Hz sine
Shock	5.5 g 11 ms half-sine	33 g 11 ms half-sine

♦ ♦ ♦ CHAPTER 2

Universal HBA Installation, Configuration, and Removal

This chapter describes the tasks required to install, configure, and remove the universal HBA. For detailed instructions, refer to your system installation or service manual.

This chapter contains the following sections:

- "Observing ESD and Handling Precautions" on page 17
- "Installing the Hardware" on page 18
- "Changing the Operating Protocol Mode" on page 22
- "Connecting the Optical and Copper Cables" on page 24
- "Powering on the System" on page 26
- "Testing the Installation" on page 30
- "Configuring the Universal HBA for Hot-Plug Operation" on page 31
- "Removing the Hardware" on page 32

Observing ESD and Handling Precautions

Caution - Damage to the universal HBA can occur as the result of improper handling or electrostatic discharge (ESD). Always handle the universal HBA with care to avoid damage to electrostatically sensitive components.

To minimize the possibility of ESD-related damage, use both a workstation antistatic mat and an ESD wrist strap. You can get an ESD wrist strap from any reputable electronics store or from Oracle as part number 250-1007. Observe the following precautions to avoid ESD-related problems:

- Leave the universal HBA in its antistatic bag until you are ready to install it in the system.
- Always use a properly fitted and grounded wrist strap or other suitable ESD protection when handling the universal HBA, and observe proper ESD grounding techniques.
- Hold the universal HBA by the carrier, not by the connectors.

- Place the universal HBA on a properly grounded antistatic work surface pad when it is out of its protective antistatic bag.

Installing the Hardware

The hardware installation process involves the following general steps, in the order listed in this section:

- "To Prepare for Universal HBA Installation" on page 18
- "To Install the Universal HBA" on page 21
- "Connecting the Optical and Copper Cables" on page 24
- "Powering on the System" on page 26
- "To Verify Proper Installation (Oracle Solaris)" on page 30

▼ To Prepare for Universal HBA Installation

1. **Record the IEEE address, World Wide Name (WWN), and serial number of the universal HBA.**

   Each universal HBA is shipped with several numbers clearly marked on the board. These numbers indicate the following:

   - IEEE Address
   - World Wide Name (WWN)
   - Serial number

   The IEEE address is a unique 64-bit identifier that you use when configuring your system. The FC industry uses the World Wide Name (WWN) derived from the IEEE address for FC connectivity. If the adapter has two ports, there are two IEEE addresses and two WWNs. Use the serial number when communicating with Oracle Service.

2. **Attach an antistatic strap to your wrist.**

   Refer to "Observing ESD and Handling Precautions" on page 17.

3. **Refer to your system installation or service manual to determine an appropriate ExpressModule slot in which to install the universal HBA.**

4. **Remove power from the system if hot plugging is not supported on the system.**

   To see if your system supports hot plugging/hot swapping of PCIe adapter cards, refer to your system documentation.

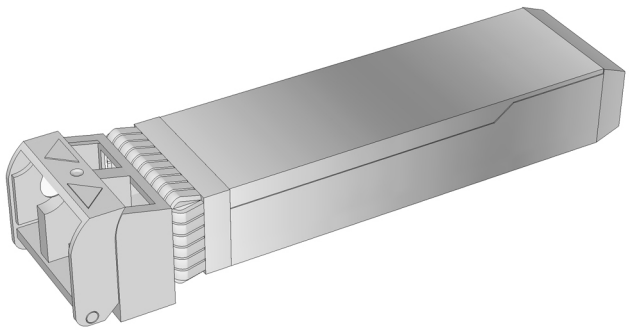
5. **If the universal HBA contains optical transceivers, and, for any reason, you need to remove and reinsert a transceiver, follow these steps:**

Caution - This is a delicate operation. Take care not to damage the optical transceiver.

Note - Only supported transceivers are allowed. If invalid or unapproved transceivers are plugged in and the board is booted, the links will not be allowed to come up. For more information about supported transceivers, see "Changing the Operating Protocol Mode" on page 22.

The universal HBA uses different types of optical transceivers (see "Universal HBA Features and Specifications" on page 9). Figure 2-1 shows an example of one transceiver type with the bail (handle) in the locked position.

FIGURE 2-1 Typical Optical Transceiver



a. **To remove a transceiver, remove the dust plug, pull the bail (handle) out and down to release the latch, and gently pull the transceiver out.**

Do not force it. After the latch is released, the transceiver slides out easily.

Figure 2-2 shows a transceiver with the latch released (bail extended) and another transceiver latched in place.

FIGURE 2-2 Releasing the Latch on an Optical Transceiver

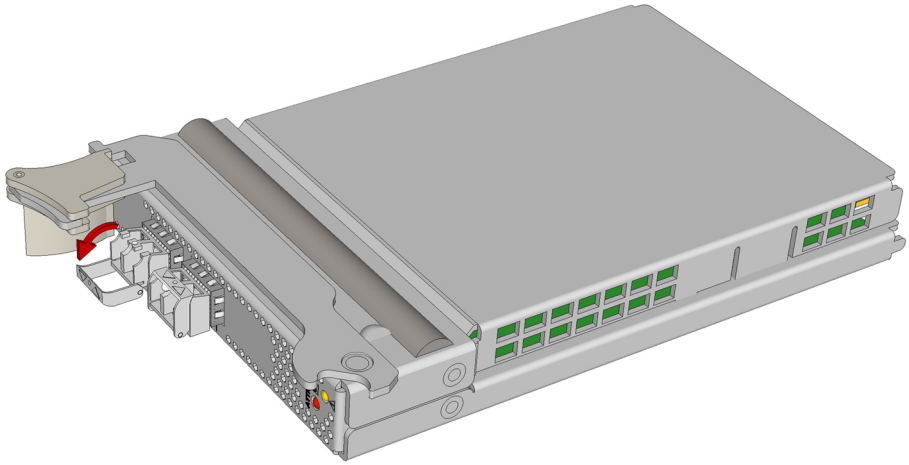
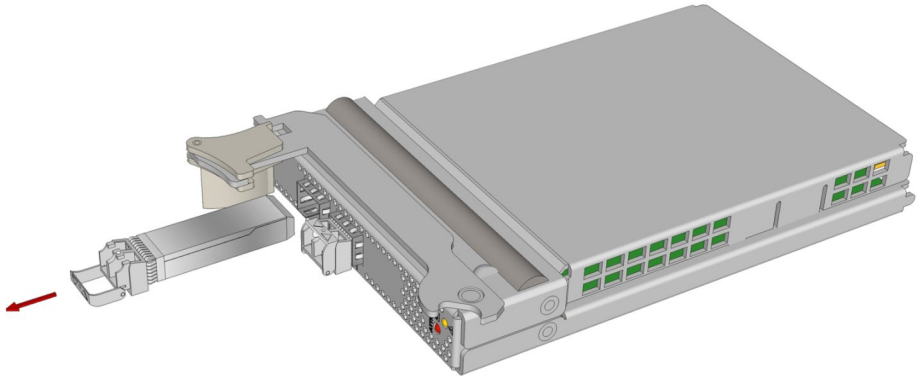


Figure 2-3 shows an extracted transceiver and another transceiver latched in place.

FIGURE 2-3 Removing an Optical Transceiver



b. Observe the electrostatic discharge (ESD) precautions, as described in "Observing ESD and Handling Precautions" on page 17, and store the transceiver in an ESD-safe place.

c. **Re-install the transceiver by sliding it into the housing.**

   When the latch engages, it clicks.

d. **Push the bail back into place.**

e. **If you do not plan to immediately attach cables to the universal HBA, reinstall the dust plug into the transceiver.**

▼ To Install the Universal HBA

After you have performed the steps in "To Prepare for Universal HBA Installation" on page 18, you can install the adapter in your system.

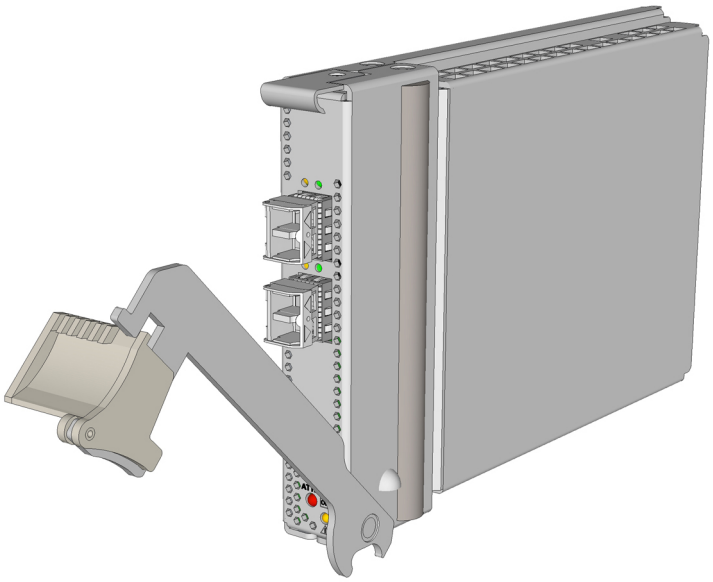
1. **Attach an antistatic strap to your wrist.**

   Refer to "Observing ESD and Handling Precautions" on page 17.

2. **Refer to your system installation or service manual to determine an appropriate ExpressModule slot in which to install the universal HBA.**

3. **Press down on the plastic tab to release the ExpressModule latch and pull the lever out until it is nearly perpendicular to the ExpressModule front panel.**

FIGURE 2-4 Pulling Out the Universal HBA Lever



4. **Insert the universal HBA into its slot, being careful that the tooth on the bottom of the lever does not come into contact with the chassis sheet metal during insertion.**

5. **After the universal HBA is inserted nearly all the way into its slot, push the lever back into its fully closed position, allowing the lever tooth to insert the universal HBA fully into place.**

Changing the Operating Protocol Mode

You can choose to change the operating protocol mode of the Sun Storage 16 Gb FC ExpressModule Universal HBA. The operating protocol mode is selected automatically by the firmware, based on the types of transceivers that you install, following these rules:

Note - The transceivers must be plugged into the HBA before the board is booted. The Sun Storage 16 Gb FC ExpressModule Universal HBA does not support changing the operating mode by hot swapping the transceivers.

- The two modes of operation are:
  - Two-port 16 Gb FC

    or,
  - Two-port 10 GbE CNA (one NIC plus (+) one FCoE function per port)
- The board operates with only one valid transceiver plugged into either port, with the following behavior:
  - Functions continue to be presented as if the universal HBA were a two-port board.
  - Functions mapped to the empty transceiver cage will be in link-down condition.
- The Sun Storage 16 Gb FC ExpressModule Universal HBA retains its last known operating state when it boots. If an invalid combination of transceivers is plugged into the HBA ports, and the board is booted, the universal HBA will return to that last known good operating mode. Thus, the behavior of the board for an invalid configuration depends on the prior configuration as follows:
  - The default operating mode is two-port 16 Gb FC. If no valid transceivers are plugged in, the universal HBA will remain in this default mode when booted.
  - If one or two valid 16 Gb FC transceivers are plugged in and the board is booted, the universal HBA operates in FC mode. If invalid transceivers are then plugged in and the board is rebooted, the universal HBA remains in FC mode, but the links are down.
  - If one or two valid 10 GbE transceivers are plugged in and the board is booted, the universal HBA operates in Converged Network Adapter mode. If invalid transceivers are then plugged in and the board is rebooted, the universal HBA remains in Converged Network Adapter mode.
  - If the last known good mode of a board was FC and the board is booted with one 16 Gb FC transceiver and one 10 GbE transceiver, the board continues to present two FC functions, but only the one mapped to the port with 16-Gb FC transceiver has an operational link. If the universal HBA is in this mode, you must change the incorrect transceiver and perform a full power reboot of the board to make the second port operational. (This must be a full power reboot and not an Oracle Solaris “FAST reboot”, which is insufficient for this operation.)
  - If the last known good mode of a board was Converged Network Adapter and the board is booted with one 16 Gb FC transceiver and one 10 GbE transceiver, the board continues to present two NIC and two FCoE functions, but only the NIC and FCoE functions mapped to the port with the 10 GbE transceiver have an operational link. If the universal HBA is in this mode, you must change the incorrect transceiver and perform a full power reboot of the board to make the second port operational. (This must be a full power reboot and not an Oracle Solaris “FAST reboot”, which is insufficient for this operation.)
- Only supported transceivers are allowed. If invalid or unapproved transceivers are plugged in and the board is booted, the links will not be allowed to come up. The universal HBA supports the following transceivers:
  - **10 GbE optical**: Short Range (SR) Optics Module (optics marketing part number 7101688) for Sun Storage 10Gb FCoE optics, SR, Emulex

- **16 Gb FC optical**: Short Wave (SW) Optics Module (optics marketing part number 7101686) for Sun Storage 16Gb FC optics, SR, Emulex
- **10 GbE copper direct attach cables**: Any cable provided with a switch that is supported by the universal HBA. For information about supported switches, see "Switch Support" on page 14.

Connecting the Optical and Copper Cables

Depending on how you plan to use the universal HBA, you can connect either optical or copper cables to the universal HBA. If you plan to change the operating protocol mode of the universal HBA by installing a transceiver, connect optical cables. If you plan to use the standard universal HBA without installing transceivers, connect copper cables.

Note - The universal HBA will not allow normal data transmission on an optical link unless it is connected to another similar or compatible laser product (that is, multimode to multimode).

Note - The universal HBA will not automatically downgrade to the required FC speed based on cable length, if both links are capable of a higher operating speed. You must downgrade the speed with the appropriate utility or link errors might occur.

When using multimode fiber-optic cables with short-wave lasers, ensure that the cables adhere to the specifications listed in Table 2-1

TABLE 2-1 Optical Cable Specifications

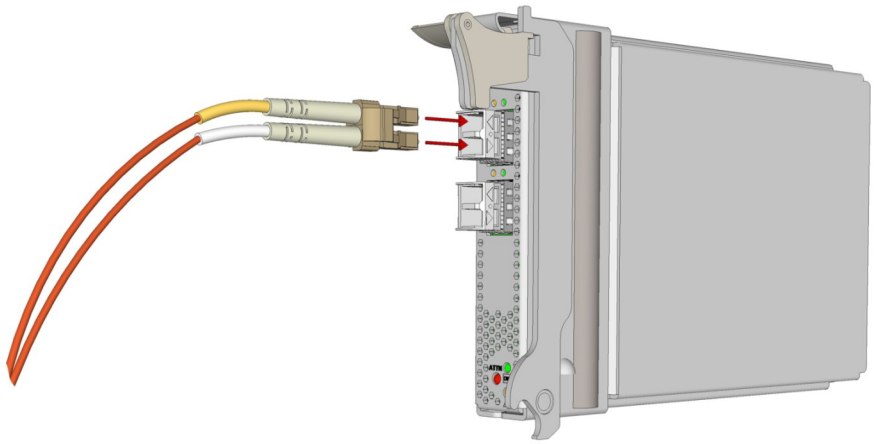
Fiber Optic Cable	Maximum Length	Minimum Length	Connector
OM4 - Multi-mode 50/125 micron fiber (4700 MHz*km bandwidth cable)	4 GFC: 0.5 m - 400 m 8 GFC: 0.5 m - 190 m 16 GFC: 0.5 m - 125 m 10 GbE: 2 m - 400 m	FC: 0.5 meters Ethernet: 2.0 meters	LC
OM3 - Multimode 50/125 micron fiber (2000 MHz*km bandwidth cable)	4 GFC: 0.5 m - 380 m 8 GFC: 0.5 m - 150 m 16 GFC: 0.5 m - 100 m 10 GbE: 2 m - 300 m	FC: 0.5 meters Ethernet: 2.0 meters	LC
OM2 - Multimode 50/125 micron fiber (500 MHz*km bandwidth cable)	4 GFC: 0.5 m - 150 m 8 GFC: 0.5 m - 50 m 16 GFC: 0.5 m - 35 m 10 GbE: 2 m - 82 m	FC: 0.5 meters Ethernet: 2.0 meters	LC

Fiber Optic Cable	Maximum Length	Minimum Length	Connector
OM1 - Multimode 62.5 /125 micron fiber (200 MHz*km bandwidth cable)	4 GFC: 0.5 m - 70 m 8 GFC: 0.5 m - 21 m 16 GFC: 0.5 m - 15 m 10 GbE: 2 m - 33 m	FC: 0.5 meters Ethernet: 2.0 meters	LC

▼ To Connect Optical Cables

1. **Ensure the transceiver cages have optical transceivers installed in them prior to connecting optical cables.**

FIGURE 2-5 Connecting the Cables



2. **Connect the fiber-optic cables to the LC connectors on the universal HBA.**
3. **After the fiber-optic cables are connected to the universal HBA, connect the other end of the cables to the FC or FCoE device.**

▼ To Connect Copper Ethernet Cables

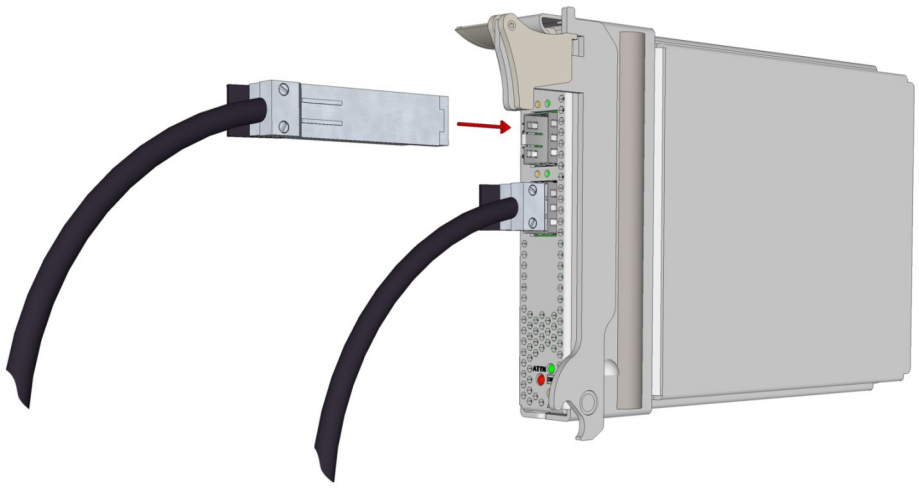
Perform this procedure if you do not plan to install any transceivers in the universal HBA. Use any SFP+ direct attach twin-ax copper cables to attach devices to the universal HBA.

1. **Insert one end of the copper cables into empty SFP+ cages on the universal HBA.**

   Ensure that the cables are fully inserted and secured.

   Figure 2-6 shows how to connect the universal HBA with a copper cable.

FIGURE 2-6 Connecting the Copper Cable



2. **After the copper cables are connected to the universal HBA, insert the other end of the cables into empty SFP+ cages on any FCoE supported switches.**

Powering on the System

This section provides basic instructions on how to apply power to the system. For detailed instructions, see your system documentation.

▼ To Apply Power to the System

1. **Verify that the universal HBA is securely installed in the system.**

   For more information, see "Installing the Hardware" on page 18.

2. **Verify that the correct copper or optical cables are attached to the universal HBA and to the FC or FCoE devices.**

   For more information, ssee “Connecting the Optical and Copper Cables” on page 24.

3. **Power on the system, as described in the system documentation.**

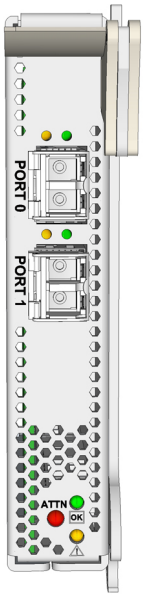
4. **Observe the light-emitting diode (LED) status for the power-on self test (POST) results as shown in “Viewing LEDs” on page 27.**

   Each port has a corresponding set of LEDs that provide a visual indication of the operating state. Table 2-2 summarizes the LED indicator combinations for FC mode, while Table 2-3 summarizes the LED indicator combinations for Ethernet mode. Refer to Figure 2-7 to determine the location of the LEDs.

Viewing LEDs

Through the openings in the mounting bracket of the universal HBA, you can view green and yellow LEDs, for each port, and you can view the Service Required and OK/Power LEDs. The green LED near each port indicates firmware operation, and the yellow LED near each port indicates port activity or link speed. Each port has a corresponding set of green and yellow LEDs, as shown in Figure 2-7. At the bottom of the universal HBA mounting bracket, you'll see the OK/Power and Service Required LEDs plus an Attention (ATTN) button.

FIGURE 2-7 LEDs and Attention (ATTN) Button



Each port has a corresponding set of LEDs that provide a visual indication of the operating state.

Table 2-2 summarizes the LED indicator combinations, and their meanings, when the universal HBA is in FC mode. Refer to Figure 2-7 to determine the location of the LEDs.

TABLE 2-2 LED Indicator Combinations for FC Mode

Green LED	Yellow LED	State
Off	Off	Boot failure (Dead board)
Off	On	POST failure (Dead board)
Off	Slow Blink	Boot failure after POST
Off	Fast Blink	Not Defined
Off	Flashing	POST processing in progress
On	Off	Failure in Common Code Module
On	On	Failure in Common Code Module
On	1 Fast Blink	Normal (Link up at 2 GFC) (legacy compatibility only)
On	2 Fast Blinks	Normal (Link up at 4 GFC)
On	3 Fast Blinks	Normal (Link up at 8 GFC)

Green LED	Yellow LED	State
On	4 Fast Blinks	Normal (Link up at 16 GFC)
On	Flashing	Not Defined
Slow Blink	Off	Normal-link down
Slow Blink	On	Not Defined
Slow Blink	Slow Blink	Not Defined
Slow Blink	Fast Blink	Not Defined
Slow Blink	Flashing	Not Defined
Fast Blink	Off	Not Defined
Fast Blink	On	Not Defined
Fast Blink	Slow Blink	Not Defined
Fast Blink	Fast Blink	Beaconing
Fast Blink	Flashing	Not Defined

Note - In FC mode, for the link rate conditions, there is a 1 second pause when the LED is off between each group of fast blinks (2, 3, or 4). Observe the LED sequence for several seconds to be sure you have correctly identified the pattern.

Table 2-3 summarizes the LED indicator combinations, and their meanings, when the universal HBA is in Ethernet mode. Refer to Figure 2-7 to determine the location of the LEDs.

TABLE 2-3 LED Indicator Combinations for Ethernet Mode

Green LED	Yellow LED	Status
Off	Off	No power or normal link down
Off	On	POST failure or invalid SFP configuration
Off	On	Normal (Link up with no activity on the link)
Blink	On	Normal (Link up with activity on the link)

Note - In Ethernet mode, in order to tell the difference between a POST failure and a link up condition with no activity, you must remove the SFP+ transceiver or copper cable. If the LED pattern persists, it is a POST failure condition. If the yellow LED was indicating a link up with no activity condition, it will turn off, which indicates a normal link down.

Table 2-4 lists the OK/Power LED states.

TABLE 2-4 OK/Power LED States

LED State	Meaning	Removal Status
Off	No power to the HBA	Removal is permitted, or the HBA must be configured

LED State	Meaning	Removal Status
Flashing	Hot-plug in process	Removal is not permitted
Solid green	HBA is properly configured	Removal is not permitted

POST Results

Power-on self test (POST) is the default mode of self-test for the Sun Storage 16 Gb FC ExpressModule Universal HBA. No jumpers or connectors are necessary for this test to run. These tests perform a quick confidence level check of the universal HBA before running the operational software.

At a minimum, the following tests are performed by POST:

- Flash boot image checksum test
- Internal ASIC RAM tests for proper ECC and parity operation
- NL Port loopback test

Testing the Installation

This section contains the following topics:

- "To Verify Proper Installation (Oracle Solaris)" on page 30
- "To Configure the Universal HBA (Oracle Solaris)" on page 31
- "To Verify Attached Storage (Oracle Solaris)" on page 31

▼ To Verify Proper Installation (Oracle Solaris)

- **Use the `cfgadm` command to verify proper universal HBA installation.**

  If the universal HBA is properly installed and connected, you will see output similar to the following:

```
cfgadm

Ap_Id              Type         Receptacle   Occupant     Condition
c3                 fc           connected    configured   ok
c4                 fc           connected    configured   ok
pcie5              fibre/hp     connected    configured   ok
```

▼ To Configure the Universal HBA (Oracle Solaris)

- **If the universal HBA is shown as unconfigured or disconnected, use the `cfgadm -c configure` command to configure the universal HBA.**

▼ To Verify Attached Storage (Oracle Solaris)

- **Use the `cfgadm -al` command to verify attached storage.**

  If the universal HBA is properly installed and storage is connected properly, you will see output similar to the following example. In this example, one port of a universal HBA is connected through a fabric switch to two ports of a disk array.

  ```
  cfgadm -al
  ```

```
Ap_Id                  Type         Receptacle   Occupant     Condition
c3                     fc-fabric    connected    configured   unknown
c3::200600a0b816005e   disk         connected    configured   unknown
c3::200700a0b816005e   disk         connected    configured   unknown
c4                     fc           connected    unconfigured unknown
pcie5                  fibre/hp     connected    configured   ok
```

  If the universal HBA is shown as unconfigured or disconnected, see "To Configure the Universal HBA (Oracle Solaris)" on page 31.

Configuring the Universal HBA for Hot-Plug Operation

Follow the procedure in this section to configure the universal HBA for hot-plug operation.

▼ To Configure the Universal HBA for Hot-Plug Operation

1. **Locate the green OK/Power LED indicator near the bottom of the universal HBA front panel, as shown in Figure 2-7.**

   The OK/Power LED indicator status is shown in Table 2-4.

2. **If the green OK/Power indicator is not illuminated, briefly press the Attention (ATTN) button near the bottom of the universal HBA front panel.**

The green OK/Power LED will blink for approximately five seconds and then remain on, indicating that the universal HBA is properly configured.

3. **To cancel the operation, press the Attention (ATTN) button again before it stops blinking.**

Removing the Hardware

The following procedure describes how to remove the universal HBA, if you need to do so for any reason. For detailed removal instructions, refer to your system documentation.

The hardware removal process involves these general steps:

1. If you plan to perform a hot-plug removal, and Emulex `OneCommandManager` is in use in your environment, stop the `OneCommandManager` process prior to attempting the hot-plug removal by issuing the `stop_ocmanager` command, located in this installation directory:
   - **Oracle Solaris** - `/opt/ELXocm`
   - **Linux** - `/usr/sbin/ocmanager`

   If you do not stop the `OneCommandManager` process first, the hot-plug removal might fail, or a system panic might occur.
2. Either halt the operating system and remove power from the system, or prepare the universal HBA for hot-plug removal with one of the following:
   - The universal HBA Attention (ATTN) button, as described in "To Prepare the Universal HBA for Removal Using the Attention (ATTN) Button" on page 32
   - The Oracle Solaris OS, as described in "To Prepare the Universal HBA for Hot-Plug Removal (Oracle Solaris)" on page 33
   - The Windows Server OS, using the Safely Remove Hardware menu
3. Remove the universal HBA from the system.

▼ To Prepare the Universal HBA for Removal Using the Attention (ATTN) Button

1. **Attach an antistatic strap to your wrist.**

   For more information, refer to "Observing ESD and Handling Precautions" on page 17.

2. **Press and release the Attention (ATTN) button near the bottom of the universal HBA front panel (see Figure 2-7).**

The green OK/Power LED near the button will blink for approximately five seconds, indicating that the universal HBA is being prepared for removal.

If you want to cancel the operation, press the Attention (ATTN) button again before the LED stops blinking.

3. **After the OK/Power LED goes dark, remove the universal HBA, as described in "To Remove the Universal HBA Hardware" on page 33.**

▼ To Prepare the Universal HBA for Hot-Plug Removal (Oracle Solaris)

If you want to remove the universal HBA without first halting the operating system and removing power from the associated system, prepare the universal HBA for removal as follows:

1. **Use the `cfgadm` command to identify the universal HBA to be removed.**

```
cfgadm
    Ap_Id              Type         Receptacle   Occupant     Condition
    pcie5              fibre/hp     connected    configured   ok
    pcie6              fibre/hp     connected    configured   ok
```

2. **Use the `cfgadm -c unconfigure` command to unconfigure the attachment point ID (`Ap_Id`) for the universal HBA.**

3. **Use the `cfgadm -c disconnect` command to prepare the universal HBA for removal.**

   A flashing OK/Power LED indicates that the universal HBA is being prepared for removal. A dark OK/Power LED indicates that the universal HBA is ready to be removed, as described in "To Remove the Universal HBA Hardware" on page 33.

▼ To Remove the Universal HBA Hardware

1. **Disconnect all cables.**

2. **Press the universal HBA latch to disengage the universal HBA, and then pull forward and down to eject it.**

   You can now remove the universal HBA.

♦ ♦ ♦ CHAPTER 3

Software Installation

After you have completed the hardware installation and powered on the system, follow the instructions listed in this chapter for your operating system to install the universal HBA driver and any other required utilities.

This chapter contains the following sections:

- "Driver Software for the Oracle Solaris OS" on page 35
- "Installing Software for the Red Hat and SUSE Linux OSes" on page 36
- "Installing Software for VMware Technology" on page 37
- "Installing Software for the Windows Server 2008 OS" on page 37
- "Configuration and Diagnostic Support" on page 38
- "Upgrading Firmware " on page 39

Driver Software for the Oracle Solaris OS

Before using the universal HBA, update the universal HBA driver software for the Oracle Solaris OS with the following SRU version or patch, at minimum:

- Oracle Solaris 11.1 OS for the SPARC and x86 platforms - SRU 6
- Oracle Solaris 10 1/13 OS for the SPARC platform - Patch 149622-02
- Oracle Solaris 10 1/13 OS for the x86 platform - Patch 149623-02

The latest available SRU versions and patches are located at: `http://support.oracle.com/`

Oracle Solaris Diagnostic Support

Diagnostic support for the universal HBA is included in the Oracle VTS software. The Oracle VTS software is available for download at: `http://support.oracle.com/`

For information about the Oracle VTS software, see the Oracle VTS documentation at: `http://docs.oracle.com/cd/E19719-01/index.html`

For information about diagnostic options using the OneCommand Manager utilities, see "Configuration and Diagnostic Support" on page 38.

The `emlxtest` utility in Oracle VTS supports the following functions:

- Connectivity verification
- Firmware version and checksum test
- Self-test
- Loopback tests
  - External (all universal HBAs (FC mode only) present in the system)
  - Internal, single-bit
  - Internal, 10-bit
  - Mailbox

Installing Software for the Red Hat and SUSE Linux OSes

Before using the universal HBA, check for the latest drivers at the Oracle support area of the Emulex web site.

For diagnostic support, you might need to rebuild the Linux driver. Before rebuilding the drivers for Linux, you must have the required Linux OS installed on the hard disk. The driver and utilities are available for download at the Oracle support area of the Emulex web site.

▼ To Install the Universal HBA Software for the Linux OS

1. **Go to the Oracle support area of the Emulex web site at:**
   `http://www.emulex.com/downloads/oem-qualified/oracle/`
2. **Click the model number (7101690) of the universal HBA for which you want to install Linux driver software and management applications.**
3. **Click the link to the Linux Driver section, locate the driver you want to install, and click the link to the driver for the appropriate version of Linux.**
4. **Click the driver kit Download icon to copy the driver to a local file system.**
5. **Click the applications kit Download icon to copy the management utilities to a local file system.**
6. **Click each of the manual icons to open the associated user manual.**

7. **Install the driver and management applications for Linux as described in the Emulex documentation.**

Installing Software for VMware Technology

The universal HBA management applications for VMware technology are available for download at the Oracle support area of the Emulex web site. However, you must obtain the drivers from the VMware web site.

▼ To Install the Universal HBA Software for VMware Technology

1. **Go to the Oracle support area of the Emulex web site at:**

   http://www.emulex.com/downloads/oem-qualified/oracle/

2. **Click the model number (7101690) of the universal HBA for which you want to install VMware driver and management application software.**

3. **Click the link to the VMware Driver section and click the link to the driver for the appropriate version of VMware.**

4. **From the Description column, click the link to the VMware web site and download the driver to a local file system.**

5. **Return to the Oracle support area of the Emulex web site and, from the Download column, click the applications kit link to copy the management applications to a local file system.**

6. **From the Documentation column, click each of the manual links to open the associated user manual.**

7. **Install the driver and management applications for VMware, as described in the Emulex documentation.**

Installing Software for the Windows Server 2008 OS

The universal HBA driver and applications kits for the Windows Server 2008 OS are available for download at the Oracle support area of the Emulex web site.

▼ To Install the Software for the Windows Server 2008 OS

1. **Go to the Oracle support area of the Emulex web site at:**

   http://www.emulex.com/downloads/oem-qualified/oracle/

2. **Click the model number (7101690) of the universal HBA for which you want to install Windows Server 2008 driver software.**

3. **Click the link to the Windows Driver section and do one of the following:**

   - **Locate the driver kit and applications kit for the appropriate version of Windows.**
   - **If available, locate the OneInstall package, which contains all drivers and applications for Windows.**

4. **Do one of the following:**

   - **Click Download next to the driver kit to copy the driver to a local file system.**
   - **Click Download next to the OneInstall package to copy the OneInstall package to a local file system, and skip to Step 6.**

5. **Click Download next to the applications kit to copy the management application to a local file system.**

6. **Click each of the manual icons to open the associated user manual.**

7. **Install the driver and management applications for the Windows OS, as described in the Emulex documentation.**

Configuration and Diagnostic Support

For Oracle Solaris, Linux, VMware, and Windows systems, use the OneCommand Manager application graphical user interface (GUI) or the OneCommand Manager application command-line interface (CLI) applications to configure the universal HBA. These applications provide support to do the following:

- Discover local and remote hosts, HBAs, targets, and LUNs.

- Reset HBAs.
- Set HBA driver parameters.
- Update firmware.
- Enable or disable the system BIOS.
- Run diagnostic tests on HBAs.
- Manage out-of-band HBAs.
- Manage local and in-band remote HBAs.

For detailed information about performing any of these functions through the OneCommand Manager applications, see the Emulex OneCommand Manager application documentation, located at the Oracle support area of the Emulex web site: `http://www.emulex.com/downloads/oem-qualified/oracle/`

Upgrading Firmware

This section provides basic instructions on how to update universal HBA firmware using the OneCommand Manager graphical user interface (GUI) and command-line interface (CLI). For detailed information, see the Emulex OneCommand Manager application documentation, located at the Oracle support area of the Emulex web site: `http://www.emulex.com/downloads/oem-qualified/oracle/`

If the universal HBA is in the CNA operating protocol mode and is installed in a system running the Oracle Linux UEK or Oracle VM operating systems, you must use the `elxflash` toolkit to update firmware. This toolkit and instructions are available at the Oracle support area of the Emulex web site: `http://www.emulex.com/downloads/oem-qualified/oracle/`

If the universal HBA is in a configuration that allows multiple virtual functions, note that firmware can only be upgraded in the primary function domain. Any attempt to do so in a virtual function domain might cause the system to hang.

This section contains the following topics:

- "To Upgrade Firmware Using the OneCommand Manager GUI" on page 39
- "To Upgrade Firmware Using the OneCommand Manager CLI" on page 41

▼ To Upgrade Firmware Using the OneCommand Manager GUI

From the Maintenance or Firmware tab of the OneCommand Manager GUI, you can update firmware on local and remote HBAs.

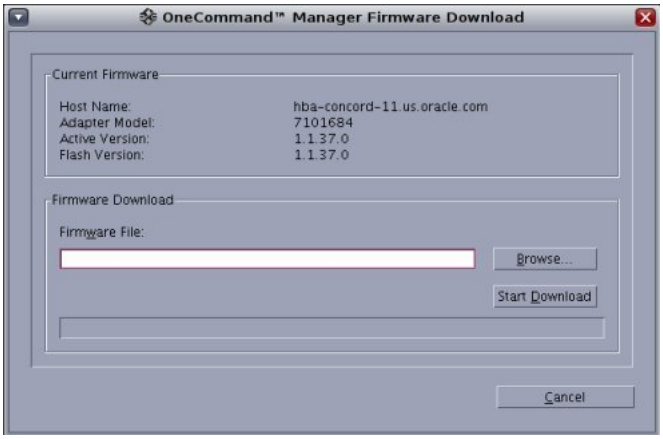
Before You Begin Before performing this procedure, ensure the following is true:

- The universal HBA driver is installed, as described earlier in this chapter.
- The OneCommand Manager application is installed and the application is NOT running in read-only mode.
- The HBA firmware zip file is downloaded from the Oracle support area of the Emulex web site, unzipped, and extracted to a folder on a local drive.
- If the universal HBA is already connected to a boot device, the system is in a state in which this type of maintenance can be performed:
  - I/O activity on the bus is stopped.
  - Cluster software, or any other software that relies on the universal HBA to be available, is stopped or paused.

1. **From the OneCommand Manager GUI, select Host or Fabric view.**
2. **In the discovery tree, select the universal HBA for which you want to upgrade firmware.**
3. **Select the Maintenance or Firmware tab and click Download Firmware.**
4. **If the warning screen appears, click Yes.**

   The Firmware Download dialog box is displayed.

FIGURE 3-1 Firmware Download Dialog Box



5. **From the Firmware Download dialog box, navigate to the unzipped, extracted firmware file that you want to use for the upgrade.**

You can navigate to the firmware image by clicking Browse or by typing the path to the file in the Firmware File field in the dialog box.

6. **After you have found the file and it is populated in the Firmware File field, click Start Download.**

   A warning dialog box is displayed.

7. **On the warning dialog box, click Yes.**

   A status bar shows the progress of the download, and the HBA in the discovery tree is displayed in black text when the update is complete.

Note - If the HBA is offline, the HBA is displayed in red text in the discovery tree.

8. **Click Close.**

   The Firmware tab displays the upgraded firmware information for the selected HBA.

Note - If the state of the boot code on the board has changed, this change is reflected immediately on the Port Information tab.

▼ To Upgrade Firmware Using the OneCommand Manager CLI

This section describes how to update firmware using the OneCommand Manager noninteractive and interactive command-line interface (CLI). Before performing this procedure, ensure the prerequisites are met, as described in "To Upgrade Firmware Using the OneCommand Manager GUI" on page 39.

- **Do one of the following:**

  - **From the noninteractive OneCommand Manager CLI, type the following command:**

    `hbacmd Download` <the-WWPN-of-the-HBA> <full-path-and-name-of-firmware-file>

  - **From the interactive OneCommand Manager CLI (for the Oracle Solaris OS), follow these steps:**

    a. **Navigate to the directory containing the `emlxadm` file (path: `/opt/EMLXemlxu/bin`), and run the `emlxadm` utility.**

       For example:

```
root@<host-name>:/opt/EMLXemlxu/bin# ./emlxadm
```

The available HBAs are listed.

b. Select the HBA you want to upgrade (you need to do this only once per device).

```
EMLXADM Device Management Utility, Version: 1.08.4.0
Copyright (c) 2004-2012 Emulex. All rights reserved.

Available Emulex HBA's:

1. SFS:emlxs0 : /devices/pci@78,0/pci8086,3c04@2/pci10df,e20e@0/fp@0,0 (CONNECTED)
2. SFS:emlxs1 : /devices/pci@78,0/pci8086,3c04@2/pci10df,e20e@0, 1/fp@0,0
 (CONNECTED)
3. SFS: emlxs10 : /devices/pci@78,0/pci8086,3c0a@3,2/pci10df,e20e@0/fp@0,0
 (CONNECTED)

Enter an HBA number or zero to exit: 1
```

c. Upgrade the firmware on the selected HBA by issuing the following command:

```
emlxadm> download_fw <full-path-and-name-of-firmware-file>
```

d. At the prompt, type `y` to confirm you want to upgrade the firmware.

A message is displayed upon completion of the upgrade.

```
Download may take several minutes. Do not interrupt.
Downloading...
Done.
```

e. Type `q` to quit, or type `hba` to select a different universal HBA to update.

f. After you have updated all HBAs, type `q` to quit the `emlxadm` utility, and perform a full power reboot of the system.

♦ ♦ ♦ CHAPTER 4

Known Issues

This chapter provides supplementary and workaround information about the universal HBA. Specific bug identification numbers are provided for service personnel.

This chapter contains the following topics:

- "System Hangs When Performing a Hot Plug Operation " on page 43
- "Link Aggregation Control Protocol (LACP) Cannot Be Used In Certain Conditions" on page 45
- "SAN Boot Fails Via Direct Attached Storage on Oracle SPARC Systems" on page 45

System Hangs When Performing a Hot Plug Operation

Bug 15811563

Conditions:

- System Platform: All supported systems using the Oracle Unbreakable Linux operating system
- Operating Protocol Mode of Universal HBA: FC, CNA
- Environment: Universal HBA connected directly to supported storage

Issue:

If you are attempting a hot plug operation, and the universal HBA is installed in a system that is running the Oracle Unbreakable Linux OS, you might encounter a system hang. This is due to the method in which you are performing the hot plug operation.

Workaround:

Perform hot plug procedures for the Linux OS as follows:

1. At a terminal window, issue the `modprobe fakephp` command to load the hot plug driver on your system.

After you load the hot plug driver on your system, you will see slots listed in the `/sys/bus/pci/slots` directory.

2. Review the available Emulex PCI device IDs by issuing the `lspci` command.

   This command lists the devices that are available for hot plugging.

```
# lspci |grep -i Emulex
08:00.0 Fibre Channel: Emulex Corporation Lancer-X: LightPulse Fibre Channel Host Adapter
 (rev 10)
08:00.1 Fibre Channel: Emulex Corporation Lancer-X: LightPulse Fibre Channel Host Adapter
 (rev 10)
```

3. Use the `cd` command to navigate to the directory where slots are listed, and issue the `ls` command to review the available PCI devices.

```
# cd /sys/bus/pci/slots
# ls
```

4. From the slots that are displayed, map the listed slots to the device IDs that were listed in Step 2.
5. Verify the power status of the slots by issuing the `cat slot-device-ID/power` command for each available slot.

```
# cat 0000\:08\:00.0/power
# 1
# cat 0000\:08\:00.1/power
# 1
```

   In this example, the output of `1` indicates the slots are powered up.

6. Issue the `echo 0 > slot-device-ID /power` command to power down the slot that you want to use for hot plugging.
7. Verify that you have powered down the slot by issuing the `ls` command.

```
# ls
0000:08:00.1
```

   In this example, you can see the first slot is powered down, because only the second slot is listed.

8. Perform the hot plug operation by inserting the card into the slot that you powered down.
9. Issue the `cd` command to navigate to the directory of the powered down slot, and then issue the `echo 1 > slot-device-ID /power` command to power up the slot.

```
# echo 1 > 0000\:08\:00.0/power
```

10. To verify that the slot is powered up, issue the `ls` command.

```
# ls
0000:08:00.0
0000:08:00.1
```

The hot plug procedure is completed without a system hang.

As an alternative, you can also use the Attention button to perform hot plug/hot unplug operations as follows:

- To perform a hot unplug operation – Press the Attention button on the HBA and wait. The OK LED will blink for 5 seconds, and then remain off.
- To perform a hot plug operation – Press the Attention button on the HBA and wait. The OK LED will blink for 5 seconds, and and then remain on.

In the event you would like to cancel an Attentionn button hot plug/hot unplug operation, press the Attention button again, after pressing the button to initiate the operation.

Link Aggregation Control Protocol (LACP) Cannot Be Used In Certain Conditions

Bug 18707752

Conditions:

- System Platform: All supported systems using the Oracle Solaris driver
- Operating Protocol Mode of Universal HBA: FC, CNA
- Environment: Universal HBA connected directly to supported storage

Issue:

LACP cannot be used on the same port as FCoE or iSCSI.

Workaround:

None.

SAN Boot Fails Via Direct Attached Storage on Oracle SPARC Systems

Bug 15809064

Conditions:

- System Platform: Oracle SPARC systems
- Operating Protocol Mode of Universal HBA: FC
- Environment: Universal HBA connected directly to supported storage
- Boot Method: SAN boot via the universal HBA

Issue:

When the universal HBA is in Fibre Channel (FC) mode in an Oracle SPARC Enterprise T4-1 or T4-2 system, and a direct connection is made with a fiber-optic cable from the universal HBA to a storage device, the system might not detect any bootable volume on that storage device. When you attempt to boot using the storage device, an error message is displayed.

```
ERROR: boot-read fail
```

Workaround:

Do not boot from a bootable volume on a storage device if that storage device is directly connected to the universal HBA. Instead, if you want to boot using the storage attached to the universal HBA, use a SAN topology that includes one or more FC switches connected in the path between the universal HBA and the target storage device.

You can use a direct connection to storage as long as the system is booting the Oracle Solaris operating system from a boot device that is not connected directly to the universal HBA.

Glossary

A

ASIC application-specific integrated circuit

B

BIOS Basic Input Output System

C

CENELEC European Committee for Electrotechnical Standardization

CLI command line interface

CNA converged network adapter

D

DAC direct-attach copper

DAS direct-attached storage

DCR direct connecting receptacle

DHHS Department of Health and Human Services

E

ECC Error Checking and Correction

EE Enhanced Ethernet

EEPROM electrically erasable programmable read-only memory

ESD electrostatic discharge

F

FC Fibre Channel

FCoE Fibre Channel over Ethernet

G

Gb gigabit

GbE gigabit Ethernet

GUI graphical user interface

H

HBA host bus adapter

I

IEEE Institute of Electrical and Electronics Engineers

IP internet protocol

iSCSI internet Small Computer System Interface

L

LED light emitting diode

LP low-profile

LUN logical unit number

M

MAC media access control

MSI-X message signaled interrupts - extended

N

NIC networking interface card

O

OFC optical fiber cable

OS operating system

P

PCI Peripheral Component Interconnect

PCIe Peripheral Component Interconnect Express

POST power-on self test

R

RAM random access memory

RH relative humidity

RoHS Restriction of Hazardous Substances Directive

S

SAN storage area network

SFP+ enhanced small form factor pluggable transceiver

SR short range

SW short wave

T

TOR top of rack

U

UCNA universal converged network adapter

V

VLAN virtual local area network

W

WWN world wide name

WWPN world wide port name